DOCUMENT RESUME

ED 476 194 EA 032 488

AUTHOR	Grubb, W. Norton; Huerta, Luis A.
TITLE	Straw into Gold, Resources into Results: Spinning Out the Implications of the "New" School Finance. PACE Working Paper Series.
INSTITUTION	Policy Analysis for California Education, Berkeley, CA.
SPONS AGENCY	William and Flora Hewlett Foundation, Palo Alto, CA.
REPORT NO	PACE-WPS--01-1
PUB DATE	2001-04-00
NOTE	55p.
AVAILABLE FROM	Policy Analysis for California Education (PACE), University of California, Berkeley School of Education, 3653 Tolman Hall, Berkeley, CA 94720-1670. Tel: 510-642-7223; Fax: 510-642-9148; e-mail: PACE123@socrates.berkeley.edu; Web site: http://pace.berkeley.edu/pace_about.html. For full text: http://pace.berkeley.edu/ wp_01_1.pdf.
PUB TYPE	Information Analyses (070)
EDRS PRICE	EDRS Price MF01/PC03 Plus Postage.
DESCRIPTORS	Change Strategies; Economics of Education; Educational Change; Educational Equity (Finance); *Educational Finance; *Educational Improvement; *Educational Resources; Elementary Secondary Education; *Expenditures; Finance Reform; Financial Policy; Instructional Improvement; Outcomes of Education; *Resource Allocation; School Effectiveness
IDENTIFIERS	*California

ABSTRACT

This policy analysis presents the "new-school" finance, one that, in contrast to most discussions about funding that have concentrated on spending patterns only, asks how resources are used within schools and classrooms, and whether they are used in ways that can enhance educational outcomes. The analysis, directed toward policymakers and educators in California, reviews a variety of literatures from different areas of education to clarify the implications of this new-school perspective for policymakers, administrators, and researchers. The first section details the political and organizational features of schools that lead to resources being spent with no potential effects on outcome. The second section reviews literature that reports on efforts to move beyond discussions of spending to more detailed analyses of resource use, including educational production functions, school-effectiveness research, and identifying effective teaching conditions. The next three sections detail the implications of the research for researchers, educators, administrators, and policymakers. The analysis concludes that without the kind of political changes necessary for the new-school finance to emerge, spending for education will keep escalating without much improvement to show for it. (Contains 2 tables, 29 endnotes, and 121 references.) (WFA)

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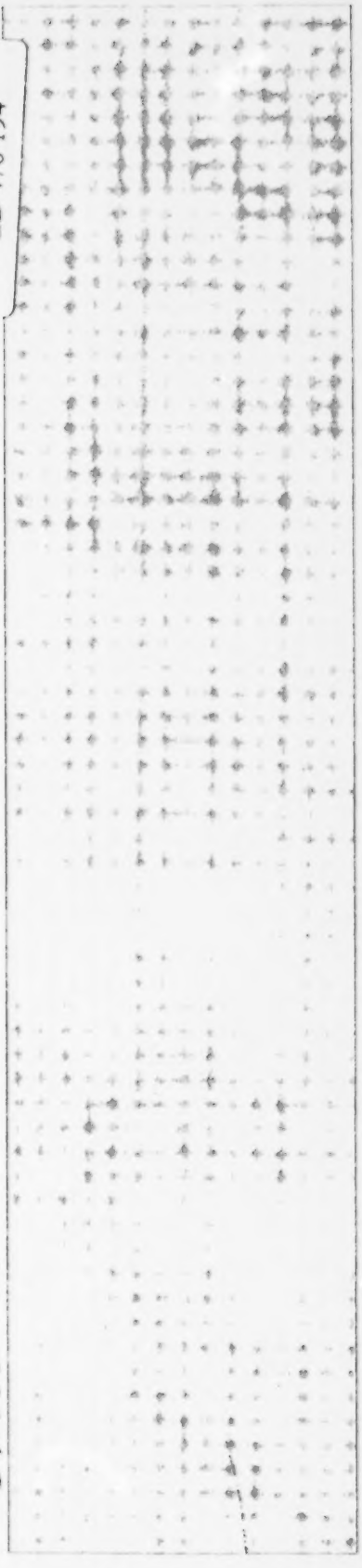

EA032 488

PACE WORKING PAPER SERIES 01-1

Straw Into Gold, Resources Into Results: Spinning Out the Implications of the "New" School Finance

April 2001

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Policy Analysis for California Education
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RESEARCH SERIES 01-1

Straw Into Gold, Resources Into Results: Spinning Out the Implications of the "New" School Finance

April 2001

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Acknowledgments

We thank Policy Analysis for California Education (PACE) and the William and Flora Hewlett Foundation for supporting this research. We also thank Bruce Fuller, Allan Odden, and Catherine Clark who made helpful comments on an earlier draft. Please send comments to:

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Executive Summary

Educational resources have been the subject of endless political battles, including efforts to expand resources and to equalize them. However, the connections between resources and outcomes remain obscure: real spending per pupil has increased steadily without any obvious effect on learning, reform efforts often cost more without any corollary effects, and there is a great deal of evidence that additional resources do not have substantial effects on learning except under special conditions.

This paper presents the "new"school finance, one that—in contrast to most discussions about funding that have concentrated on spending patterns only—asks how resources are used within schools and classrooms, and whether they are used in ways that can enhance educational outcomes. This approach is not particularly new, since many researchers have called for more careful investigation of how resources are spent when their analyses failed to reveal clear relations between spending and outcomes. However the "new" school finance has not been the subject of consistent investigation, and there has been little progress in understanding the conditions under which spending will (or will not) enhance learning. This paper reviews a variety of literatures, from different areas of education, in order to clarify the implications of this perspective for researchers, for practitioners (like principals), and for policy makers.

While the "old" school finance perspective has usually assumed that additional resources are self-evidently valuable, it's clear that there are many ways to spend resources to little effect. The first section of this paper details what might be called the political economy of waste: the political and organizational features of schools that lead to resources being spent with no potential effects on outcomes. The purpose of such a conceptualization is to clarify how difficult it might be to spend additional resources and enhance educational outcomes, however measured. It also leads to a series of hypotheses for what one might find in examining, the effects of any spending increases, suggesting the research strategy of asking "where the money has gone," being careful to trace the effects of funding to the school and classroom levels.

Section II reviews several areas which have, contrary to the "old" school finance, tried to move beyond discussions of spending to more detailed analyses. The effective school literature is one such area, though it tended not to examine resource use and generally did not examine classrooms. The literature on educational production functions is another, with its tendency to conclude that "spending doesn't make a difference." But it generally fails to specify how resources are used within the schools, and therefore crucial variables—teacher experience, for example, or class size—may have either positive or negative effects on outcomes like test scores. The solution in both cases is to trace resources more carefully to the ways in which they are used within the classrooms and schools. In the case of educational production functions, this leads to more complex equations; teaching characteristics and student ability to benefit from instruction are two crucial variables, with resources influencing outcomes by improving either of these two. In addition, the interactions among different aspects of

practice—for example, between teachers' practices and students' motivation, between teachers' practices and school policies, between school practices and district or state policies—mean that various resources interact in complex and unknown ways, contrary to the simple linear additive specification of most production functions. The section ends with various suggestions, drawn from the reform literature, about how to measure teaching characteristics and student ability to learn.

The following sections detail the implications for research, for educators, and administrators, and policy-makers. The potentially valuable directions for research include analyzing natural experiments where spending increases suddenly, to understand how such windfalls are actually used; analyzing self-conscious reform efforts that use resources in specific (and varying) ways; returning to the effective schools strategy in somewhat modified ways; and estimating more complex versions of educational production functions. The implications for practitioners include the need to determine what might be effective practice, and then the search for ways to fund it—a bottom-up or site-base approach to spending priorities.

For policy makers, the implication of the "new" school finance is that spending may be necessary but not sufficient to enhance outcomes. The challenge in policy is therefore to determine what might be necessary in addition—potentially, the restriction of spending in the manner of categorical funding, or the enactment of complementary reforms, or the development of leaders (like principals and the superintendents) with the requisite reform vision. Various recent failures in state and federal policies, like the likely ineffectiveness of reducing class sizes, provide some clues for alternative policy directions.

The "new" school finance is a difficult subject because it demands that funding be treated not as political spoils, nor as self-evidently effective, but as only one of the resources necessary to make schools effective. Developing the associated agendas for research, practice and policy will take sustained effort and a reformulation of thinking about resources. The alternative is to continue the current patterns in which expenditures in education keep expanding with little to show for them.

Introduction

It's impossible to deny the importance of resources to education. Generations of reformers have come along, each with a new formula for reforming schools, each needing more money—"spending again and again and again," to paraphrase Cuban's (1990) review of reform efforts. Advocates for poor children have rediscovered disparities in spending nearly every decade, from Ellwood Cubberly's (1905) complaints about reliance on local revenues at the turn of the century to Jonathan's Kozol's (1993) latest attack on "savage inequalities." And in a political system dominated by interest group liberalism, debates over school resources often dominate those about teaching and learning—battles over inputs rather than outcomes, means rather than ends—despite pleas to "put education above politics."

But the inadequacy of debates over resources—of the debates, not necessarily the resources themselves—has become apparent to many participants. In K-12 education, real resources per pupil in public schools have risen constantly throughout this century, as Table 1 indicates. Although spending has been relatively stable (in real terms) during the 1990s, spending per pupil has doubled since the late 1960s, and it rose particularly fast during the 1960s, 1970s, and 1980s. In terms of more comprehensive measures of public resources in education, Table 2 clarifies that we spend more as a fraction of Gross Domestic Product than virtually any other developed country except Canada, partly because of our extensive enrollments in higher education. (Our spending on elementary-secondary education is closer to the average of these countries.) It's difficult to argue in any simple way for more spending, if only because the past thirty years of higher spending have not resolved educational problems nor brought about the reforms we might need. Those states that have litigated school finance issues successfully have seen disparities in spending between rich and poor districts decline markedly (Hickrod et al., 1997), without disparities in achievement among students decreasing in any obvious way. And while some urban districts still have low levels of spending, other cities have spending levels well above the national average—for example, Washington, DC with $8,290, Hartford with $10,017, Boston with $8,225, Newark with $10,925, Kansas City with $9,436[1]—and still have not escaped the patterns of limited offerings, high dropouts, low test scores, low rates of movement into post secondary education, high turnover among teachers and administrators, and political turmoil that defines the urban condition.

And so it's not enough to debate the resources in schools, as many advocates have come to realize. Money may be necessary for improved learning, however defined, but it cannot be sufficient. Instead it's critical *in addition* to ascertain how these resources are spent—whether they are spent on activities and practices within schools and classrooms that enhance teaching and learning, or whether they are spent ineffectively.[2] This idea has been stated in several different vocabularies: for example, the concern over "more bang for the buck" in educational politics and journalism

(Boyd and Hartman, 1988); the emphasis on the efficiency of school spending, in the vocabulary of economists (e.g., Levin, 1994); and the focus on the improvement of teaching, among those who have been principally concerned with teachers and pedagogy (e.g., Miles and Darling-Hammond, 1998). And then, as everyone knows, students bring their own resources to the classroom —motivation, willingness to learn, certain basic attitudes and literacies that schools generally take for granted. Without these student resources, school spending may be quite ineffective—or, alternatively, it may be necessary to spend public resources on mechanisms to enhance student preparedness, like early childhood programs, family literacy efforts, or parent participation. While the range of these other factors necessary to make school spending effective is quite large, as we will clarify in Section II, the logic underlying them is similar: school spending can be effective in enhancing learning only in conjunction with specific practices—in schools and classrooms, in families and communities—that themselves contribute to learning.

The central insight of what might be called the "new" school finance—in contrast to the "old" school finance that has concentrated only on spending patterns, and has sometimes neglected how resources are used within classrooms and schools—is that the effective use of resources is a two-stage process. It's first necessary to ascertain those practices and teaching conditions within schools and classrooms[3] that enhance learning. Then it's necessary to allocate resources to those practices, rather than to other ineffective uses. (We will formalize the distinctions between resources and practices in Section II, when we present a small extension of the education production function approach.) This insight is not particularly new, since others frustrated with the limits of the "old" school finance have come to the same insight.[4] In addition, the current efforts in school finance litigation have been trying to move beyond equity measured by funding to conceptions of adequacy based on the ability of resources to achieve certain levels of performance (e.g., Clune, 1994; Minorini and Sugarman, 1999). But even if the "new" school finance is not new, its perspectives are not yet widespread, either in research, or in legislation and policy-making, or in the practices of administrators and school reformers. Analyses of school resources still concentrate on the dollars spent, rather than how these resources are used (e.g., Ladd, Chalk, and Hansen, 1999, from the National Research Council's Committee on Education Finance). Some reforms like class size reduction continue to spend huge sums with little regard for how changes will affect classrooms. Principals and other school leaders seem to pay little attention to the educational efficacy of their spending decisions, despite school-based management and other changes that give them (some) greater power (Boyd and Hartman, 1988). So it's worth continuing to articulate the perspectives of the "new" school finance since it will not become the dominant perspective or narrative for examining school resources until educators, policy-makers, and researchers all embrace it.[5]

In this paper we first examine in Section I the inadequacy of the "old" school finance—the view that concern with spending is sufficient. This critique readily leads to a deeper understanding of why spending seems so often to be derailed into ineffective practices, particularly in urban school districts. This kind of conceptual approach is useful since if it were possible to identify effective practices, it would still be necessary to channel resources to them—and to understand the political and organizational difficulties of doing so.

In Section II we examine several efforts to examine effectiveness. One is the production function literature relating outputs (usually test scores) to inputs like pupil-teacher ratios, teacher experience, and teacher ability. This literature has—unfortunately, and despite substantial effort—failed to provide enough insights about how resources should be used within schools and classrooms. Its general analytic framework could be elaborated to do so, and we provide several examples of how to do so. However, we suspect that these formal models are more useful as metaphors of how schools work than as guidance for statistical analysis. When we examine current ideas about effective practices, we can easily develop a long list of educational resources that cannot be easily measured—and so the estimation of an adequate production function is likely to be a long way in the future.

A second literature on efficacy is that of the school-effectiveness literature, with its effort to find out what distinguished high-performing schools. However, many of these characteristics—for example, strong educational leadership, or an orderly school climate—do not necessarily cost much (even though they may require substantial effort), reinforcing the conclusion that "money doesn't matter." This literature did not look carefully into classrooms, and often neglected resources issues; like the educational production function research, it doesn't lead in any obvious way to recommendations for spending. We end this section with a listing of the kinds of teaching conditions (at both school and classroom levels) and student attributes that have been the focus of various researchers and reformers, suggesting the kinds of influences that need to be considered.

If the perspectives of the "new" school finance are to be useful, then they must provide some guidance for new forms of research, and beyond that for practice and policy. In Section III we outline the implications for research—including the accounting exercises that are common in investigating equity—that might, over a longer period of time, yield such answers. In Section IV we outline the implications for administrators, particularly principals operating under the greater school-level control allowed by site-based management or charter schools. Finally, in Section V we outline the implications for legislation and policy, both in specific cases (e.g., the legislative efforts to reduce class size) and in general, by distinguishing several ways to get resources to schools in more effective ways.

The perspectives of the "new" school finance are ways of bridging one of the great divides in education. Macro perspectives—often drawn from economics, political science,

history, sociology, statistics, and other social sciences—have focused on the large economic, apolitical, historical, and cultural influences on schools, but usually without entering the classroom. Micro or classroom perspectives, often drawing on psychology, have emphasized the interactions among teachers and students, but have often neglected the macro forces that have structured the classroom, and the roles of teachers and students, in particular ways. Often the twain do not meet—as in the "old" school finance, which has investigated the determinants of spending without asking how it influences classrooms, or in the educational production function literature that has left the classroom as a black box. But the "new" school finance needs to ask how resources are related to school and classroom practices—and so it might lead to a more complete analysis of education than the great divide has often allowed.[6]

Many educators don't like to think much about money—it's dross, or straw, or filthy lucre than impedes loftier goals like educating all children to the limits of their potential. But if it's tainted, it's also a necessary evil, necessary for producing the varied educational results that educators, and parents, and policy-makers want. The conversion of resources into results should not be like Rumpelstiltskin's magic that enabled the miller's daughter to spin straw into gold, and the "new" school finance should move away from alchemy toward a clearer understanding of the requirements for effective school spending.

I. The Political Economy of Resource Use: The Diversion of Dollars

The boundless concern, among educators and politicians alike, about the level and allocation of dollars seems to assume that financial resources are the currency of the realm—the only kinds of resources worth discussing. But there are infinite ways for these resources to be misspent, without making changes in classrooms and schools that might affect learning, or (in the language of Cohen, Raudenbusch, and Ball, 1999) to be inert rather than active. We need mention just a few:

- Resources can be embezzled, or spent to hire friends and relatives of little ability.
- Resources can be spent on what economists call rents—for example, on increases in salaries that do not call forth greater efforts, a larger supply of prospective teachers, or reduced turnover—so that teachers, administrators, or suppliers benefit at the expense of taxpayers but conditions in school do not change and students do not benefit. This may happen in justifiable circumstances, for example when teachers are under-paid relative to comparable professionals. If such salary increases reduce turnover, then they might be effective over the long run—but if turnover is caused more by teaching conditions than salaries, then even justifiable increases are simply rents.
- Resources can be spent without changing practices—as when staff development fails

to change how teachers teach—or without getting reforms "right," as when a school makes a change incompletely or ineffectively. This is part of the implementation problem, and many studies of implementation can be read as analyses of how resources are misspent.

- Resources can be spent on well-intentioned but ineffective practices—adopting "technology" without knowing how to use it, or following the reform du jour that has no effect on learning. Sometimes resources are spent on symbolic practices—perhaps a new program to enhance retention, or a change in superintendents to assure parents that everything possible is being done—that don't have much chance of affecting learning.

- Education requires a great deal of spending for buildings, administration, transportation, safety measures, sometimes food and other social services that are necessary before even one child enters the classroom; these non-instructional expenditures average about 34 percent of overall K-12 budgets. While necessary, such resources (and increases in them) do not contribute in any direct way to enhanced learning.

- Resources may be spent on changes that are necessary for learning to improve, but are not by themselves sufficient—spending on computers without staff training, on reducing class size without worrying about the supply of qualified teachers, or alleviating the commotion within a school without improving teaching. A perfect example involving class size came in Austin, Texas, where 15 schools received an additional $300,000 per year for five years. In thirteen cases achievement didn't change despite reductions in class size; as the district superintendent explained, "They didn't change the way they were doing things . . . All they did was take that support, lower pupil-teacher ratios, still use the same curriculum, still use the same instructional methods" (Murnane and Levy, 1996, p. 94). Often schools with windfalls of money have to spend a great deal on deferred maintenance, new buildings, or up-to-date textbooks—all surely necessary but unlikely by themselves to improve learning

- Resources may be spent on changes whose effects are distant—like improving school climate and orderliness, involving parents or investing in family literacy programs, or developing a cadre of committed teacher-leaders able to spearhead reform. Then if change takes place—a new principal or superintendent, a different reform du jour, a shift in the governance structure—the resources spent in earlier changes are effectively lost. The problem of rapidly changing reforms is part of this issue since developments in one direction are then reversed.

While there are surely more ways of converting money into ineffective or inert resources, these are enough to clarify our point. Furthermore, these reasons tend to fall into one of two categories: some of them (the first three, as it happens) undermine any changes taking

place in schools and classrooms; others (like the last four) do change practices, but the practices are in the end ineffective. The trick is *both* changing practices in schools *and* making changes that matter to learning, however learning is defined or assessed.

What's troubling about public schools is not that they occasionally misspend resources, but that they seem to be structured to do so. It's simple to develop a "theory" of resource use that identifies the structural conditions—political, organizations, and economic—that direct resources away from enhanced learning. Consider these widely-accepted features of public education, at different levels of the schooling system:

Conventional politics as practiced in the U.S. usually involves interest groups in the struggle for scarce public resources, where the power of interest groups derives from their cohesion and numbers and not from the rightness or effectiveness of their causes. The constituency for jobs is often more powerful than the constituency for improved educational performance, and resource-starved communities are most likely to battle over resources as sources of jobs and salaries, not as inputs to improve education. The voices for improved performance (like those of parents) tend to be fragmented into class and racial groups anyway, particularly in urban districts. The best chance for interest group politics to improve the quality of education probably exists where parents with homogeneous preferences and organizational competence can exercise their voice—like middle-class parents in small suburbs.

In addition, education seems especially prone to symbolic politics, which by definition engages in battles that are not about the effectiveness of educational practices but about the image and authority of grown-ups. The current debates about eliminating social promotion, the development of "naming and shaming" tactics in district and state policy,[7] and much of the current standards movement strike us as largely symbolic, more concerned with an image of educational toughness than with any careful analysis of what might help the performance of students. (Or, putting this in a kinder light, demands for enhanced performance are only half the problem, with the other half being the ability of schools to respond—but politics now seems to gravitate toward the tough demands.) Symbolic politics are likely to be especially acute in urban districts because the depth of problems makes symbolism attractive, because racial politics often gets converted into symbols (like the race of the superintendent and his or her staff), and because hardball politics—say, Guiliani in New York or Daley in Chicago—discourage considered decisions, consensus and compromise.

Several much-discussed characteristics of schools as organizations—loose coupling, organizational inertia, the lack of slack resources—exacerbate the implementation problem, so that resources for reform are often spent without changing much of anything. In addition, the technical difficulties of developing effective practices, which (we argue below) require a series of jointly necessary and individually insufficient conditions—or, to

revert to slogans, whole-school (or whole-*district*) change rather than piecemeal reform—are substantial in any event. But they are particularly difficult under the conditions in many schools– including disagreements over goals and pedagogies, instability in personnel, inconsistencies in conceptions of roles, the inevitable lack of resources. Instability and turnover—among teachers and administrators, as well as among students—make changes requiring stability much more difficult. All these conditions appear to be worse in urban districts where the lack of consensus, poor personal relationships (Payne, 1998), the instability of virtually all personnel, and the lack of slack resources all thwart change in any form.

Within schools, many classes seem to have developed implicit bargains or treaties: teachers pretend to teach, and students pretend to learn (e.g., Powell, Farrar, and Cohen, 1985). The day of reckoning, when students leave school for a competitive world, is too far off, or poorly understood; the discipline necessary on all sides to continue learning is too difficult, particularly when teachers feel that they work under difficult conditions, or students are distracted by family issues, or the siren calls of an entertainment culture are too strong. As in so many other areas of social life, a high-quality (or high-learning) equilibrium requires real effort to sustain it; once these conditions fail, schools and classrooms slide into a low-quality (or low-learning) equilibrium, where participants reinforce each other's ineffective behavior. Under these conditions all the resources in the world won't make much difference. Politicians and reformers may deride low expectations and low motivation all they want, but rhetoric is hardly sufficient to reverse the situation. The standards movement might have a way out of the low-quality trap, by providing all participants the same motivation simultaneously, but only when students and teachers alike accept the legitimacy of these standards and have the facility to respond to them.

Finally, school finance litigation, which has been such a powerful influence on spending issues, is necessarily a crude instrument of policy. Courts can forbid practices but cannot (or will not) usually specify what should take place, and their remedies are usually fashioned in the simplest of terms. This has reinforced a tendency to see the problem as one of spending levels rather than the use of resources, since courts have usually been concerned with spending. Only recently, with conceptions of adequacy based not merely on spending but instead on efforts to achieve certain minimum levels of performance (e.g., Clune, 1994; Minorini and Sugarman, 1999), is there any possibility for the instructional concerns to enter litigation strategies.

So it isn't hard to develop a long list of structural conditions, rooted in the nature of politics, in the organizational features and economic conditions of public education, in the relationship between legislative and judicial decisions, that indicate why resources may be poorly spent rather than spent in ways that might enhance learning. Furthermore, our working hypothesis is that these conditions are

much worse in urban and poor districts (e.g., Ballou, 1998; Payne, 1998), where improvements in learning are most needed, compared to affluent and suburban districts. From this perspective the problem in urban schools is not necessarily that resources are inadequate (though that may be true in some districts) nor that the conventional urban "problems" like students without parental support, unmotivated students, too many LEP and special education students are so serious (though that too may be true), but rather that structural conditions make urban districts unable to address their own issues with the resources they have. Ineffectiveness in spending and inert resources come to dominate, and it's small wonder that "resources don't make a difference."

Each of the structural conditions we have outlined contains the idea for its solution. Eliminating symbolic politics in favor of reasoned debates about what would be best for children can happen within individual schools, and certainly does when a community, a principal, and some dedicated teachers coalesce around educational goals (e.g., Meier, 1995; Comer, 1996). Replacing interest group politics with more principled debates over education and resources can certainly take place with new approach to teacher unionism and less confrontational politics (e.g., Kerschner and Koppich, 1993; Peterson and Charney, 1999). Reducing many forms of instability also happens in successful schools that have generated loyalty among staff and consistent attendance among students. So the purpose of articulating the political economy of resource use is not to be discouraging, but rather to clarify the conditions necessary to make more effective use of the resources schools already have.

Much of what we've discussed so far involves the problems of using resources to change schools and classrooms, rather than to pump more money in and leave the essential conditions of teaching and learning unchanged. But the second necessary question is what changes are effective. What practices within schools and classrooms will really enhance learning? If we *knew* the answer to this question, then we could concentrate our efforts on spending money wisely, on clearing away the organizational and political and economic barriers to effective spending. This is the direction of the Obey-Porter legislation providing federal funds for "proven practices"; of categorical funds for specific practices "known" to work, ranging from Head Start to school lunches; of foundation efforts to replicate successful models of practice; of reformers creating networks of schools replicating their promising practices, like the Coalition of Essential Schools, the Accelerated Schools movement, schools following Success for All or the Comer model of community involvement of efforts to develop small schools. This is also the strategy of the effective schools literature, which tried to identify the conditions in schools that were "known" (through statistical analysis) or thought (by reputation) to be especially effective.

One problem is that it's nearly impossible to come up with a list of "proven practices." The American Institutes for

Research inventory of 24 school wide reforms (AIR, 1999) claims that only three of the 24 have "substantial" evidence for their success—and then the detail (which few except researchers will read) reveals that one of the three (High Schools That Work) has no comparative research; another (Direct Instruction) has been evaluated by standardized tests well-suited to its emphasis on specific skills but not to broader conceptions of learning.[8] The effectiveness of several major federal categorical programs—particularly Chapter I, and (for political as well as technical reasons) bilingual education—has been extremely controversial. The networks of reforming schools all acknowledge that the fidelity of the reform varies enormously, which makes it difficult to distinguish the effectiveness of the reform idea itself from its implementation. And controlled experiments have always been anathema in education (Cook, 1999) and so—in contrast to the job training world, where they have been much more common[9]—hard-nosed analysts can always claim that some aspect of selection or self-selection is responsible for any positive results. Therefore it's hard to come up with a definitive list of "proven practices," and educators continue to be blasted for not having the evidence that other fields—medicine is the most common comparison—presumably have.

The second problem is that, as we shift from issues of implementation to questions of what practices we want to implement, the unavoidably political issue arises of what we want education to be. Do we, for example, want to measure outcomes with standardized tests of grammar facts and decontextualized time-rate-distance problems, or do we want authentic writing exercises and real problem-solving? Where do we stand in the reading wars and the math wars, between the advocates of conventional teacher-directed, behaviorist instruction with content drawn from school versions of the conventional disciplines and the advocates of more constructivist, student-centered, interdisciplinary and project-oriented instruction?[10] Where do we stand on various versions of bilingual education, some that simply help non-native children pass conventional multiple-choice English tests and some that value and help maintain important aspects of their original culture? Sometimes an educational idea is elastic enough that many different practices can march under its banner—like bilingual education, or the Coalition of Essential Schools that seems to include both highly traditional schools drawing on the principle of "using one's mind well" as well as constructivist schools drawn to its use of exhibitions—but this only exacerbates the problem of deciding what the reform is. And so the notion of "proven" or "promising" practices that enhance learning can't be disentangled from discussions about what education is all about. In contrast, most tests of "proven practices" and virtually all the state and district efforts to improve schools through "naming and shaming" transacts this discussion by relying on conventional multiple choice test scores as the only measure of effectiveness.

In the absence of any definitive evidence about what enhances learning or any political

consensus about what learning is, we often place resources in the hands of people who might know. Sometimes these are principals, who have been granted greater powers in some version of site-based management; in other forms, school councils including parents, administrators, and teachers have the power to decide. Sometimes, as in voucher and choice mechanisms, parents are given the right to decide what enhances learning. Conventionally, local school boards have been given this authority—and district policies and practices presumably express their decisions about effective practices. More recently states have played more active roles; many recent policies are more concerned with the quality of instruction than the allocation of funds has been—state tests for students or teachers, state standards or curriculum guides, staff development and pre-service education requirements, pilot projects of various kinds. And the federal government has resources too, and in some legislation—Obey-Porter, the expansion of Chapter I to allow whole-school changes and practices other than pull-out programs, the requirement to integrate academic and vocational education in the Perkins Amendments—Congress expresses its conceptions of effective use of resources.

Each of these implicit decisions about who is best able to decide the effective use of resources has its own limitations. Principals are often unengaged in much thinking about educational issues (as we will outline in Section IV), teachers may continue with business as usual, parents have limited information about educational alternatives, school boards and legislatures are concerned more with conventional politics than with effective practices, and so on. In many circumstances, asking who has the power over resource allocation—and therefore over explicit or implicit decisions about effective practices—simply returns us to the political and organizational issues we raised earlier. But in the absence of much certainty about "proven practices," we might at least ask who has the budgetary authority to determine how resources are spent and what their engagement with educational issues is.

And so both the major questions of the "new" school finance—how are resources spent at the school and classroom levels, and whether they are spent on practices that might enhance learning, however measured—are difficult, each in its own way. And while many of the answers may be obvious and discouraging, there's no substitute for confronting the conditions under which resources are now going for naught.

II. Converting Resources to Results: Opening the Black Box

Several areas of research have wrestled with the ways resources are spent, and could therefore provide some guidance about how best to spend available resources. Unfortunately, these investigations have often not gone far enough into the school and the classroom (even though other lines of research have), and as a consequence their results are

often unhelpful. In thinking about more productive approaches to research, in Section III, it's helpful to review these lines of research, particularly the efforts to link outputs to inputs through educational production functions and the attempts to identify the characteristics of effective schools. Finally we will review a series of claims of what practices might be effective, from reformers of different stripes.

Educational Production Functions

Educational production functions, like production functions in economics, attempt to link inputs to outputs, but without being precise about the nature of production itself—that is, about the nature of education. The most common production function can be simply represented as

(1) $SO = f(R, FB) + u$

where SO represents school outcomes, R includes information about resources, FB measures the effects of family background, and u is an error term. In theory SO could include any kinds of educational outcomes, including competencies measured by new and "authentic" assessments as well as conventional test scores, and including *changes* in various abilities as well as *levels* of competencies. In practice outcomes have invariably been measured by levels of conventional test scores. The school resources R are generally those that can be readily measured—spending per pupil, pupil/teacher ratios, teacher experience, sometimes measures of teacher "ability" like test scores, and other school resources like library books and science labs. In theory resources R could include those accumulated over time, in a series of schools from kindergarten through the time when outcomes are measures, though a static and therefore incomplete measure of resources is conventionally used (except in Krueger, 1997). Measures of parental occupation, or education levels, or income levels are normally included to correct for the effects of family background, and occasionally more detailed information is available—for example, about reading material and other practices in the home—to capture other resources available to students. Such equations have been estimated for many different data sources, with different units of analysis—sometimes individual students, sometimes classrooms, sometimes schools or districts. There's also a large literature on third-world countries (reviewed in Fuller and Clark, 1994) which departs from the American results where there are truly enormous differences among countries—for example, in the availability of textbooks—but which often reproduces many of the American conclusions.

The finding that the effects of resources are, more often than not, statistically insignificant (Hanushek, 1986; Hanushek et al., 1994; see also the symposium on Primary and Secondary Education in *Journal of Economic Perspectives*, Fall 1996) has often been interpreted as showing that "spending doesn't make a difference" because of the relatively small and variable effects of school resources compared to the powerful and consistent effects of family background.[11] One way to challenge this negative interpretation has been the technical critique that Hanushek's summary of the literature was not properly carried out, and

that a formal meta-analysis (rather than the counting exercises used by Hanushek) yields somewhat more positive results (e.g., Hedges, Laine, and Greenwald, 1994). The upshot of this debate about how best to summarize a literature with wide-ranging results has been a relatively weak statement: resources might matter under some conditions (Hanushek, 1997; Hanushek et al. 1994)—though it isn't clear what these conditions might be.

A different response to the conclusion that "spending doesn't make a difference" has been to rely on those few studies that do confirm a relation between resources and outcomes. Project START, the Tennessee experiment in class size reduction, randomly assigned students to larger and smaller class and to larger classes with aides, and found substantial gains in learning, lasting at least until sixth grade, with especially high gains among black students (Mosteller, 1995; Krueger, 1997; Nye et al. 1993). Because the Tennessee results were presumably achieved with random assignment,[12] they have been especially widely cited. In addition, Ferguson's (1991) analysis of Texas districts found significant positive effects of teacher scores on a statewide test, students per teacher, teacher experience, and teaching with master's degrees; Ferguson and Ladd (1996) found substantial effects of school resources in Alabama. Most recently Payne and Biddle (1999) critiqued the methodologies of conventional production functions and then went on to estimate an exceedingly simple and aggregate (district-level) equation, claiming to find a strong effect of spending per pupil on math achievement.

One problem with this response is that it ignores the many serious research efforts which have failed to find significant effects—the uncomfortable fact that Hanushek has tried to remind us of. In the realm of random assignment studies, for example, the frequent citations to the Tennessee experiments usually fail to mention an earlier experiment in Toronto, with a greater range of class sizes, a more transparent randomization procedure, a much richer variety of outcomes measured, and a more lucid explanation of the results, but that failed to find effects of resources on any of six test scores except for math concepts (Shapson, Wright, Eason, and Fitzgerald, 1980). A second problem is that even those studies that have found certain resources to be effective have acknowledged that they cannot tell *why* resources might make a difference. For example, Ferguson's (1991) analysis of Texas districts acknowledged that "we can only speculate what teachers with high scores do differently from teachers with low scores" (p. 477). Similarly, the Tennessee experiments could not clarify why smaller classes made a difference. One of the studies suggested that greater teacher morale, more frequent teacher-student interaction, or a greater variety and extent of student participation might be responsible (Finn and Achilles, 1990). On the other hand, Mosteller (1995) inferred from teachers and administrators that small classes might be better for socializing young children to school, and Krueger's (1997) results are also consistent with a socializing mechanism—an interpretation that suggests that small classes would have declining effects as students

become older. In a re-analysis of these data, Goldstein and Blatchford (1998) noted the high among-school variation in reading scores—implying that the effects of class size reduction might have differed among schools, possibly because of teacher expectations of students who had been in smaller classes. Once again, they called for greater attention to the processes within the classroom in order to illuminate the causal process.

A substantive or educational critique of this literature—that is, one that pays attention to the conditions of teaching and learning—is that it treats the educational process as a black box, and fails to specify how resources are used. (These studies also fail to specify precisely how socio-economic status and other aspects of family background affect educational outcomes like test scores, though this point has been less widely noted.) From the perspective of the "new" school finance, spending per pupil may increase, but without knowing more precisely *how* resources are used, it's inappropriate to expect that increased revenues will increase test scores or any other outcome. Similarly, teacher experience might enhance learning as experienced teachers develop more effective practices through trial and error, through staff development, or through collaboration with their peers; but given the inherent weaknesses in these forms of improvement and the possibility that experienced teachers are burned out rather than skilled, there's no *a priori* reason to expect greater experience by itself to increase test scores or any other outcomes. If teachers with more education tend to receive more degrees in their disciplines and become more oriented to coverage of the discipline, rather than learning more about teaching strategies, then additional formal schooling might not increase student learning. If pupil-teacher ratios are reduced but teachers continue lecturing in the same old ways, then again an expensive reform will fail to improve learning in any form. If resources like library books and computers are available but go unused—or, even worse, are used in pull-out sessions with librarians or computer specialists who interrupt regular classes—the availability of such materials might not enhance learning and might even reduce it.

To know more precisely how resources are used, direct observations of educational practices would probably be necessary to see, for example, whether teachers teach differently when they have smaller classes, or whether experienced teachers show signs of burn-out rather than increased facility.[13] Shapson et al. (1980), with their collection of information about teaching practices through classroom observations, provides confirmation of this approach: they found that, while teachers felt that classroom conditions were improved in small classes, they did not change their teaching practices in many ways, and so a reduction in class sizes without an attempt to change practices was ineffective.

One way to summarize this critique of conventional production functions is to elaborate the formal model used. The simplest approach is simply to recognize that resources can be used to enhance various kinds of teaching conditions TC, and that these teaching conditions in turn enhance learning and outcomes of various kinds. Formally,

(2) $TC = f(R) + e$

(3) $SO = g(TC, FB) + u$

The first of these equations describes the ways in which resources are (or are not) translated into the classroom and school conditions related to learning—for example, teachers who have mastered and practiced a range of pedagogies, schools with a collegial atmosphere in which teachers provide sustained support to one another, a school atmosphere that is purposive and orderly.[14] The second equation describes the effects on these teaching conditions on valued outcomes of schools, both cognitive and non-cognitive. In contrast to this formulation, the conventional production function (equation 1) is a reduced form version of (2) and (3), conflating two very different processes.

We can continue to elaborate this model. One further approach (particularly emphasized by Cohen, Raudenbusch, and Ball, 1999) recognizes that students come to school with very different abilities to benefit from conventional schooling (call this student ability to benefit, or SA). This reflects differences among students in their cognitive preparation for schooling, in their motivation, in the expectations of their parents, in the resources and discipline provided by their parents and others around them. The variations in students' ability to benefit from instruction provides a specific way for family background to influence school outcomes, but this ability can also be enhanced by public resources—by early childhood programs, the efforts of teachers in the early grades to socialize children (as in the Tennessee results), family literacy efforts, programs to increase parent participation, guidance and counseling, mentoring efforts, and the like. Conversely, it may be undermined by conditions leading to student resistance (Willis, 1977), or black students' notion that school success is too "white" and therefore reprehensible (as Fuller and Clark, 1994, emphasize in their description of the "classroom culturalists"). Furthermore, teaching conditions and a student's ability to benefit from schooling surely influence one another. For example, teachers may respond positively to motivated students and negatively to those who are disruptive; schools provide different levels of resources through tracking or teacher assignments to students perceived to have different levels of preparation—sometimes more and sometimes less (Gamoran, 1988; Brown, 1988). And student motivation may increase as teachers shift to more constructivist practices, or to project-based learning, or as schools create more orderly and learning-centered cultures. Formally, this means that TC and SA affect one another, or:

(4) $TC = f(SA, R, \ldots) + e$

(5) $SA = g(TC, R, FB, \ldots) + u$

(6) $SO = h(TC, SA, FB, \ldots) + v$

Compared to equations (2) and (3), this model places greater emphasis on the many effects—both school-based and family- or community-based—of student engagement and motivation. However, the reduced-form equation from this model is still equation (1)—clarifying once again that conventional production functions ignore the multiple processes internal to schools by which outcomes are generated. If, for example, a

school allocates experienced teachers to unmotivated students and thereby enhances their engagement, but not by enough to eliminate the differences among motivated and unmotivated students, then a conventional production function will show that teacher experience reduces outcomes when it has in fact narrowed these differences.

This example clarifies another problem with conventional production functions: There's no reason to think that patterns of allocating resources and of generating teaching conditions are the same in all schools. The conversion of resources into teaching conditions, in equation (4), is a process that principals under site-based management, or parent or school-level councils, can in theory influence. Similarly, the use of resources to affect student motivation and ability to learn, in equation (5), may vary from school to school, or at least from district to district as different programs to motivate students are attempted. Indeed, as Brown and Saks (1980, 1982) have pointed out, individual teachers make resources decisions *within* their classrooms, as they allocate more or less time to low-performing students, to certain kinds of students (girls, or Latinos, or LEP students, for example). The attempt to estimate reduced-form production functions like equation (1) assumes that the underlying processes within districts, schools, and classrooms are uniform. If this is not the case, then the reduced-form coefficients will be weighted averages of the coefficients for individual districts or schools, and could readily average positive and negative coefficients and find effects to be close to zero. Thus one point of elaborating the processes by which schooling outcomes are achieved is to focus our attention on the different ways schools (or individual teachers, for that matter) can use the resources they are given.

A second problem with conventional production functions, particularly if we use them as guides for statistical analysis using conventional linear regression, is that they don't help researchers and educators think about the *interactions* among different variables. As we argued above, many conditions necessary for effective learning may be necessary but not by themselves sufficient. For example, from equation (6), teachers skilled in constructivist methods (one element of TC) will not be effective if students have been prepared only in behaviorist classrooms (part of SA) and do not work well under the less obviously disciplined conditions of a student-centered classroom; either teachers have to re-socialize their students, or they may revert to more conventional teaching. If there needs to be an equilibrium between teachers' approaches and students' expectations,[15] then neither is effective without the other. Similarly, reduced class size might required staff development in order to enable teachers to change their approaches; to use computers effectively, teachers almost certainly require more staff development (President's Committee, 1997); and many reforms intended to reshape teaching fail because of the lack of staff development, or principal support, or stability, or assessments that are consistent with their goals. A congruence among teaching staffs, principals and other administrators, and district policies is

often necessary, so that reforms can fall apart when a school takes one route while the district tries to impose another. But the statistical techniques used by researchers are not good at detecting the influences of variables that are necessary but not sufficient, and so conventional production functions are also liable to misstate what happens within schools.[16]

Obviously there are many data problems in thinking about how to estimate equations (2) and (3), or alternatively (4), (5), and (6). Outcomes are usually measured by conventional tests scores rather than more varied measures of learning; gain scores, or changes in learning, are rarely available; measures of teaching conditions TC and students' ability to benefit from instruction SA are not widely available; few data sets provide any information on the *cumulative* experiences and resources of students. Therefore these equations are for the moment more useful as metaphors for conceptualizations of the processes underlying learning, to focus the attention of researcher and educators on the important issues, rather than as equations that could be statistically estimated.

School Effectiveness Research

The literature on effective schools developed in response to findings from early production functions that "schools don't make a difference." The research began to examine the characteristics of effective schools, some of them selected as outliers in statistical studies of test scores controlling for the socio-economic status of students, and others selected by reputation. Various studies came to roughly the same conclusions, often summarized as the "five-factor model": effective schools are those with strong administrative leadership, high expectations for student achievement, an orderly atmosphere conducive to learning, an emphasis on the acquisition of basic academic skills, and frequent monitoring of student progress (Edmonds, 1979a and b; Austin, 1981; Clark, 1980). Of course, the number of factors can be expanded; for example, Sammons, Hillman, and Mortimore (1996) have articulated an 11-factor model relying somewhat more on British and European findings—though all the factors cited in these reviews tend to overlap. Some of them (e.g., strong leadership, an orderly and learning-oriented environment) emphasize characteristics of *schools*, while others (like high expectations, an emphasis on purposeful teaching and learning) focus on characteristics of individual *classrooms* and *teachers*, though understanding that some characteristics of effective *classes* are made much easier if conditions within the *school* are supportive.

Quickly, however, effective school research came under attack (e.g., Purkey and Smith, 1981; Rowan, Bossert, and Dweyer, 1983; Cuban, 1984; Cohen, 1983). One problem, present also in educational production functions, is the measurement of effectiveness by conventional test scores; then the finding that effective schools stress conventional academic skills—the only competencies covered in conventional tests—and monitor students constantly (with the same standardized tests) is almost a tautology since it says that effective schools as measured by conventional

tests stress the competencies required by conventional tests. The methodologies of identifying exemplary schools have also been critiqued, and the case study methods used to investigate schools were often unstandardized and incomplete—though the consistency of findings in the five-factor model tend to offset this criticism. Finally, the results of this literature have often been cited and used in a formulaic fashion, as if the five-factor model could be considered a recipe for success; in practice, however, the implementation of these factors is considerably more complex, with some of them (e.g., the need for strong leadership) frequently misinterpreted or used in simple ways that did not consider the interactions among the factors influencing learning. As with educational production functions, the effective schools literature did not have a way of thinking about conditions that might be necessary but not sufficient.

For our purposes, two aspects of the school effectiveness literature are particularly important. One is that, with their emphasis on the characteristics of *schools*, most studies failed to enter the classroom to see what teachers might be doing differently in these schools (Tedlie and Stringfield, 1993, Chapter. 10 and Conclusions). Thus much of the school remained a black box, as it continues to be in educational production functions.

Second, this literature has little to say about the allocation of resources. Indeed, many of the characteristics of effective schools in the five-factor model can be implemented without additional resources—though perhaps different (and more expensive) staff development might be useful to enhance expectations and develop programs for monitoring student progress. But in general these studies were either silent about resources, or failed to find any systematic relationship between effectiveness and the resources provided to schools. One could read the school effectiveness literature as reinforcing the simple conclusion of educational production functions that "resources don't make a difference."

However, a different reading suggests instead that the *ways resources are used*, rather than the level of resources, has made a difference to effective schools—and the study of effective schools at least began to identify what ways of spending money might be effective. In addition, some authors have noted that some minimum spending level might be necessary but not sufficient to guarantee effectiveness; as Gray (1990) concluded, in language similar to our own, "adequate levels of resources seem to be necessary but not a sufficient condition for a school to be effective. In twenty years of reading research on the characteristics of effective schools I have only once come across a record of an 'excellent' school where the physical environment left something to be desired" (p. 213).

Thus both educational production functions and the school effectiveness literature suffer from some similar flaws, including reliance on conventional test scores, a simple model of causality, and an inattention to the "black box" of the classroom. The case studies of effective schools did at least enter schools and ask what was going on within them; the methodology remains an attractive

one, to which we return in Section III, and the conclusion that resources might be necessary but not sufficient is consistent with our argument throughout this paper—and may lead, as we will see in Section V, to a plan for different kinds of funding mechanisms. But neither literature has been particularly successful in linking resources to outcomes through the mechanisms of schools and classrooms.

Identifying Effective Teaching Conditions

In order to think abut schooling in this more complex way, we need to distinguish among the resources R that schools and districts have; the teaching conditions TC that might influence learning outcomes, some of which require resources and some of which may not; and the student ability to benefit from instruction, which may come from school efforts including resources, from parent and community influences, from social or cultural influences, and from other sources. Resources, which are the most readily measured of these three kinds of variables, can be described by expenditure per pupil, or (as in conventional production functions) can be disaggregated into components like the teacher-pupil ratio T/P, average teacher salaries S, and other components of expenditure like administration costs per pupil A, materials costs per pupil M, capital outlays per pupil K, and so on, leading to the obvious identity:

(7) R__ (T/P) S + A + M + K + . . .

Given a conventional salary structure, the average teacher salary reflects the proportion of teachers with greater amounts of experience and higher credentials together with the salaries paid to each category of teacher. Therefore an identity like (7) includes almost all the resource variables conventionally included in production functions like equation (1).

It's more difficult to specify measures of teaching conditions that might enhance student outcomes, because there's been such varied research relating such teaching conditions to outcomes (equation 3 or 6)—this is the problem of coming up with "proven practices." However, even if there's not much definitive research, it's worth summarizing what various researchers and advocates have said about effective teaching conditions because the list clarifies the kind of information that researchers could collect and the goals that reformers might pursue. Here's a list, necessarily partial, of what to look for in order to measure teaching characteristics TC and student ability to benefit SA:

1. **Teacher characteristics:** Teachers with regular credentials, rather than emergency credentials; teachers with degrees in their field of specialization, rather than teachers teaching out of their fields (Raudenbusch, Fotiu, & Cheong, 1999; Monk, 1994); teachers with course work in pedagogy (Monk, 1994); teachers with high verbal scores or other measures of ability.[17] The efforts to recruit more Black and Latino teachers assumes that the race or ethnicity of teachers matters, at least to some students or to some forms of learning (such as those about race), but this shibboleth has rarely been examined empirically.

2. **Staff development:** Many reforms require staff development, and many reforms have failed for lack of staff development. However, given the widespread perception that most staff development is ineffective—particularly Friday afternoon workshops and other "one-shot" efforts—the *form* of staff development may be more important than the amount, with continuous efforts with peers a potentially more effective approach (Darling-Hammond and McLaughlin, 1996; Lieberman, 1996). A related condition requiring resources is organizational "slack," or time and energy that can be devoted to improvement; schools in which teachers are frantically busy (as most schools are) don't have any resources to put into either diagnosing or correcting their problems.

3. **Interactions among teachers:** Common planning time (Miles and Darling-Hammond, 1998), or school structures like "houses," schools-within-schools, Academies (Stern, Raby, and Dayton, 1992), majors (Grubb, 1995), or joint classes that facilitate or require common planning. It's clear that such structures are necessary but not sufficient, since some schools have houses or Academies without having them do anything; they exist on paper only.

4. **Interactions between teachers and students:** Many commentators, particularly those stressing student-centered teaching, have emphasized the respectful and considerate treatment of students, and many horror stories (including tales of racist and sexist practices) describe instances of abusive or uncaring teachers. Miles and Darling-Hammond (1998) emphasize teachers knowing students well, and go on to describe some practices that can enhance that: creating smaller schools, or smaller units (like houses or Academies) within large schools; reducing the number of aides and specialist teachers so that teaching resources are spent on classroom teachers; teaching in longer blocks of time so that teachers teach the same amount of time per day but face fewer students. Class size reduction is another method of enhancing the interactions between teachers and students; however, if these reductions are relatively small[18] or if teachers continue lecturing as they always have, then an expensive reform may not influence learning at all.

5. **Effective teaching practices:** There is an extensive literature investigating effective teaching practices which has identified practices like time on task and on new material, high expectations, frequent monitoring of progress, a warm yet disciplined classroom environment, certain patterns of questioning and reinforcement, and many other characteristics that are no doubt necessary in a variety of settings (e.g., Brophy and Good, 1986; more generally Wittrock, 1986; Waxman and Walberg, 1993). The

problem is not that the conceptions and results about effective teaching are missing; indeed, there are almost too many results, with different studies emphasizing different aspects of teacher behavior. But in particular data sets—for example, the NELS data set examined in Goldhaber and Brewer (1996), or the NAEP data analyzed in Raudenbusch, Fotiu, and Cheong (1998—only a few practices are measured. Only when data have been experimentally collected—for example, by the Toronto experiment analyzed in Shapson et a. (1980) or some of the international studies summarized in Fuller and Clark (1994)—has it been possible to include a variety of teacher practices.

6. **Constructivist teaching practices:** Within the past 15 years there's been much more attention to constructivist teaching, and there's even some evidence that such practices are more effective.[19] Constructivist practices remain controversial, however, and the "reading wars" and "math wars" pit advocates for traditional skills-oriented teaching against constructivists. A judicious middle ground—indeed, a Deweyan synthesis—would argue for a hybrid approach to teaching combining both behaviorist and constructivist practices, and recent reviews by the National Research Council have supported such a synthesis (Snow, Burns, and Griffin, 1998).

7. **The use of time:** Time on task is one of the most consistently-mentioned resources. While the absolute amount and proportion of time devoted to instruction may be important, others have noted that blocks of uninterrupted time may be as (or more) important, encouraging the shift to block scheduling. The National Commission on Time and Learning argued for greater flexibility in the use of time, allocating time to fit instructional requirements rather than the other way around (National Commission, 1994). However, instructional time is a good example of a teaching condition that is necessary but not sufficient. More time devoted to inept teaching is hardly likely to improve the quality of learning, even though simple recommendations to extend the school day or school year are common.

8. **School offerings:** Raudenbusch, Fortiu, & Cheong (1999) have documented the effect of offering "advanced" courses (measured in math by algebra I, which doesn't seem particularly advanced). One reform in Southern states, High Schools That Work, has emphasized the replacement of general track offerings—general math or general science—by more demanding academic or integrated courses. In various states including California, access to the courses required for university admission is an issue since some urban schools don't offer these courses. Others have stressed the importance of extensive writing

opportunities in all classes, and the National Writing Project also stresses the importance of both the amount and the kind of writing—valuable not only to learn to write well but also as an adjunct to reflection and constructivist learning. Evidently many schools—especially urban high schools—don't provide advanced enough offerings to challenge their students.

9. **School climate:** an orderly or disciplined climate (see generally the school effectiveness literature), or a climate in which learning is central. The emphasis on *school* conditions shifts the emphasis from the classroom level, and clarifies that what a teacher does in the classroom is affected by what happens in other classrooms. This concern starts to move toward student attitudes toward learning, since these are presumably shaped by other teachers—and a student's entire history of experiences in schools—as well as by family and community influences.

10. **School vision:** A related condition is a vision for a school as a whole, with consistency of vision between the principal and teachers a related characteristic. Many reform efforts—for example, the precepts of the Coalition of Essential Schools, or the avoidance of "remedial" pedagogies in Accelerated Schools, or "education through occupations"—have a vision at their center, one that is more effective when it is consistently articulated and practiced by all the members of a school community. The literature on effective schools has also stressed the importance of "strong" principals, where one characteristic of strength is a vision that is communicated throughout the school. As with school climate, the emphasis on a consistent vision and whole school reform clarifies the importance to individual classrooms of what happens in other classrooms.

11. **Stability:** The *absence* of stability is often mentioned as detrimental to reform, and instability in student participation—from moving around schools or attending sporadically (Rumberger and Larson, 1998)—is detrimental to individual students, and perhaps to classes and schools as well. Stability is another resource that is necessary but not sufficient since a school may be stable but mediocre—so reform efforts *and* stability may be jointly necessary.

12. **Student behavior and ability to benefit from schooling:** These characteristics can be directly measured by such variables as self-reported interest in school, time spent on homework, and attendance (e.g., Taylor, 1998, using NELS data). Other measures would focus on levels of disruption versus cooperation in the classroom. This kind of variable provides one explanation for the effects of family background (or socio-economic status, or class, or income) on school

performance, though this explanation would surely be controversial; often, the reasons behind the effects of family background are not explicit. These kinds of explanations have led to efforts to reshape family and community culture and make them more consistent with conventional school values—for example, through early childhood education to enhance school readiness, parent education, family literacy efforts to facilitate literacy in the home, efforts to increase parental involvement, and guidance and counseling to clarify to students the importance of schooling. Most of these efforts have been quite marginal, and some have been undermined by the class and racial biases embedded in them, but the tactic of reshaping families and their influences directly—or at least getting them to reinforce the mission of the schools—remains attractive to reformers.

13. **Peer effects and students as resources:** It's clear that students of higher socio-economic status are a resource to other students (e.g., Gamoran, 1988); that is, students do better when they are in schools with higher SES students, even controlling for their own family background. Parents consistently try to have their children attend schools with higher SES students—or avoid schools with low-SES students (as white and Asian parents avoid schools with black and Latino students). But precisely what explains the effects of peers remains ambiguous, although aspirations or expectations, compliant versus inattentive or disruptive behavior, and ancillary knowledge are among the possible explanations. Like the shift from the classroom to the school, the recognition of peer effects clarifies that the resources influencing teaching conditions include the entire social composition of the school, and resources devoted to (or withdrawn from) some students will influence other students.

There are several things to notice about these various teaching characteristics and dimensions of student ability to benefit from instruction. One conclusion is that many of them are necessary but not sufficient, so that single-dimension reform efforts are likely to be ineffective. As a result, it's possible to spend substantial sums on reforms but have little to show for them. This seems to be the case with class size reduction in California, for example, where there have so far been few changes in teaching practices in reduced-size classrooms (CSR Research Consortium, 1999).[20]

Another conclusion is that, while some of them (like the staff development efforts required for reforms, or the introduction of computers) require additional resources, others require that existing resources be used in different ways (staff development is a clear example). Some of them—like the mobility of low-income students—probably cannot be changed for any sum of money, and similarly it's hard to imagine how to increase the stability of teachers and administrators in urban districts

under current conditions except by paying truly huge sums of money. In other cases, changes might be achieved either though resource-intensive or cost less ways; for example, the standard recommendation to have strong principals might be attained by increasing salaries to have a larger pool of individuals from which to choose, or by restructuring the job so that it is attractive to more teachers, but it might be possible instead to reshape the programs that prepare principals so that they pay more attention to educational rather than to administrative aspects of the job. A vision for education is in some sense cost-free, though developing such visions has usually been the business of reformers who have devoted substantial resources to spreading their vision.

A final conclusion is that, as we consider these measures of effective teaching conditions or student resources, each becomes more complex. Staff development is not enough; the kind of staff development, and no doubt its consistency with a particular vision of reform, must be known. Time on task may not be enough; blocks of time and the flexibility of its use may be necessary. And so elaborating the conception of resources leads us to still further elaboration.

As a result, the implications for resources of trying to enhance any of the teaching conditions we have just outlined are ambiguous—at least in our current state of knowledge. And so, for the moment, we are forced to come back to the conclusions of the production function literature: resources might affect learning under some conditions, but we still aren't sure what those conditions are.

III. Implications for Research

From the perspective of the "new" school finance, the task for research is to determine the practices within schools and classrooms that enhance learning, however defined, *and* to determine the resources they require. Discussions of resources should never be divorced from how they are spent, and the school and classroom should never be left as a black box. Now, this is a tall order, since it requires different types of information in any one piece of research. However, there seem to us at least four promising directions for research. Some of them—like returning to effective schools research with a slightly different focus or trying to find data sets with certain variables—return to previous research strategies; others, like exploiting natural experiments, may be somewhat different. But all of them try to probe more deeply into schools and classrooms, to understand the effects of resources "at the coal face," as the Aussies say—in the crucial interactions among teachers and students.

Natural Experiments

Occasionally, schools experience substantial infusions of money. This has happened, for example, in school finance cases where states have increased their aid to districts, as in Kentucky, New Jersey, and Texas; this happened in the Chicago schools in 1990, as part of the Chicago School Reform Act. In other cases pilot projects have increased resources to a select group of schools, as California's AB1274 reforms did; currently a set of "underperforming " schools will be

provided grants up to $168 per student, with the intent of allowing them to increase their test scores. These "natural experiments" provide opportunities to see first whether and how the additional resources are spent to enhance teaching conditions, and second to ask whether these changes might improve learning and other schooling outcomes. The first of these questions—what do additional resources buy—needs to be answered not only at the level of the district and not only by detailing the effects on gross measures of resources like class size, pupil/teacher ratios, and administrative expenses, but ideally at the level of the school and classroom, by examining the effects on the teaching characteristics mentioned in the previous section. There is now a literature asking "where does the money go," tracking the effects of reforms in New Jersey (Firestone, Goertz, Nagle, and Smelkinson, 1995), New York (Lankford and Wyckoff, 1995), Chicago (Hess, 1999), and nation-wide (Monk, Nabib, Odden, and Picus, 1995; see also Picus and Wattenbarger, 1996). Goertz and Natriello (1999) have summarized the effects of spending increases in three states, concluding that patterns of spending by functional areas (instruction, administration, etc.) are relatively unchanged after finance reforms. But these research efforts tend to confine themselves to the effects on gross measures of resources—on administrative costs, average teacher salaries (rather than what such salary increases might buy in terms of teacher ability or stability), and spending for special education, for example. Another generation of studies needs to trace the path of spending from the initial increases, to effects on gross resources, to the effects of these resources on classroom and school practices.

For example, in his examination of the reforms in Chicago, Hess (1999) clarified that schools used their discretionary funding—which grew from $197 per pupil per year to $763 over a five-year period—in very different ways. Schools with improving achievement tended to enrich their offerings by adding computers, music, art, science labs, and physical education. Those with declining achievement spent more on resource teachers in math and reading, classrooms aides, reduced class sizes, discipline, counseling, and truancy programs. Arguably, then, the more effective schools spent their resources on enriching the curriculum, while the ineffective schools engaged in "remedial" practices and spending on personnel other than classroom teachers—who, according to Miles and Darling-Hammond (1999) and Krueger (1997)—may be ineffective.

An examination of reforms in California (Little et al. 1999), which provided a select number of schools with an additional $155 extra per student per year (or about four percent) over five years, found that resources were largely spent on "basics" or "more of the same"—staff time, computer equipment, and other conventional instructional resources—because most California schools are starved for resources (the state ranks 47th in spending per pupil). Very little was spent on staff development— which might have led to changes in teaching and learning—and spending had little to do with restructuring

different schools. A central question remains whether resources were spent in ways consistent with a reform vision, and this was difficult to detect without considering the full range of funding and reforms.[21] In both Chicago and California reforms, therefore, schools used additional resources in myriad ways, the effectiveness of spending can be undermined in myriad ways, and so the conditions necessary for additional resources to enhance learning are both complex and varied. These kinds of studies would over time provide a clearer image of the preconditions necessary for school reform and increased spending to be more effective.

The approach of learning "where the money goes" would be most valuable in understanding the political economy of resource allocation introduced in Section I, including the political and organizational forces that often undermine the effective use of resources. In the terms of Section II, this kind of research is more concerned about the resource allocation of equation 2 (or equations 4 and 5), and can say relatively little (at least directly) about the efficacy of these resources (equations 3 and 6)—though Hess' effort to distinguish schools by increasing or declining achievement is one rough way to approach efficacy. But at least this approach could help us learn more about the allocation of resources to the school and classroom characteristics that might matter—that are necessary (if not sufficient) preconditions for more effective schools.

Evaluating Self-Conscious Reforms

A related research tactic would be to investigate how self-conscious reforms spend additional resources, and how they do (or do not) use these resources to make changes in practices that might matter to learning. The investigation of such reforms differs from the analysis of increases in spending because reforms are—presumably—driven by a particular vision of what must change. In practice, however, some reforms make changes, but what they do is unlikely to enhance learning; others may have greater possibility for enhancing learning, but be unable to effect the changes required by their vision. Only those reforms that do both stand any chance of succeeding—and they may provide guidance about how to use resources effectively.

Several examples provide a sense of what such research might undertake. Odden and Busch (1999) have reviewed the spending practices of New American Schools. While these schools have a core of funding practices in common, including a principal and a teacher for every 25 students, they also incorporate a strong standards-oriented curriculum. Each has a particular vision in addition that directs marginal resources to particular purposes—for example, funding for trips in Expeditionary Learning-Outward Bound; technology coordinators and technology-related staff development for Co-NECT; art and music teachers and computer technologies for the Modern Red Schoolhouse. These schools have budgets within the normal range of schools, but the specificities of resource use are governed by particular visions of reform.

Similarly, the Puente project is an effort to improve the performance of Latino students by developing more constructivist approaches to teaching English and writing in ninth grade, using selected Hispanic literature to explore issues of identity, creating smaller learning communities of students within large high schools, adding counselors to these learning communities to help students understand the requirements of the schooling system, and using Latino mentors to provide other resources to students. An evaluation (Gandara, 1998) using a roughly equivalent comparison group[22] has confirmed the effectiveness of Puente in enhancing college course completion and college-going rates. The program's additional resources of about $500 per pupil were spent principally on staff development to train ninth-grade teachers in constructivist teaching methods; on additional counselors; and on the administrative costs of identifying mentors. In this case again there's a clear relationship between the vision of the program and the patterns of spending, and the elements of the program reinforce one another; for example, the additional spending on counselors does not simply add resources to conventional counseling, but rather adds counselors that have specific roles for Latino student within learning communities. Gandara documents another effective (and anonymous) reform effort, costing $578 per student or roughly the same as Puente, that spent its resources very differently, for additional teachers, summer training, and classroom materials—making the same point we do that effective reforms can use their resources in very effective ways as long as they follow a coherent vision of reform.

An evaluation of Career Academies in California revealed that students in the program, compared to a similar group of students, were less likely to drop out of high schools and more likely to graduate and continue to college. Of the additional resources, 42 percent were spent on additional teacher time, since academies have smaller classes and additional time for teachers to work with other teachers and employers. An additional 40 percent of the incremental costs were spent on employers' representatives, since creating internships and other connections with employers is a critical feature of Academies (Stern et al., 1989). Again, this reform allocated its marginal resources to those practices central to its vision of change.

These examples suggest the variety of ways that resources can be used to create improvements in learning. There's no single recommendation that emerges from these cases; rather, there are various ways of spending additional resources that seem effective. However, all in these cases, spending is driven by a particular vision. As the reform vision dissipates, or is implemented unevenly, the potential effectiveness of the reform vanishes. For example, in the case of the AB1724 reforms in California examined by Little and her colleagues (1999), the additional resources of about $155 per student were often spent on core services in a low-spending state, were sometimes subject to substitution as districts redistributed non-AB1274 resources to other schools, and were sometimes subject to district restrictions on how funds could be spent—all

undermining the intent of focusing additional resources on reforming practice. Under these conditions, additional funding was spent within many schools in bits and pieces, without any unifying vision or mc:ive—and under these conditions it's unlikely that much improvement can result.

Returning to Effective Schools

The research tactics already examined look at cases where resources have increased, and try to follow the use of resources into the school and classroom, and hopefully to outcomes. Another way of carrying out such research would be to start with exemplary outcomes, and then trace back to see how resources are used. This is the tactic of the effective schools literature—except that these studies did not generally examine resource use. In addition, the studies of effective schools often did not look inside classrooms to see what (if anything) was different in the teaching practices of particularly effective schools; many characteristics commonly cited—strong principals, an orderly climate, frequent monitoring of student progress—describe schools as a whole rather than of classroom practices.

One possible example of a different study of effective schools is that of Miles and Darling-Hammond (1998). They concluded from the research literature that effective schools require teachers knowing students well, and cite the reform literature as supporting common planning time for teachers to "create new practices and engage in school problem-solving." They then searched for particularly effective schools, as measured by above-average and improving student performance, and that also had mechanisms to enhance the abilities of teachers to know their students well—particularly by replacing non-classroom teachers (like aides, specialist teachers, and some administrators) with classroom teachers to reduce class size—and to work with one another. These were schools that used resources to particular purposes, and their practices clarified that the particular use of time—not just the amount of time on task—may be important. Finally, unlike the older effective schools literature, this study observed in classrooms to see the instructional effects of these changes. Unfortunately, the causal relationship between teachers knowing students well and the outcomes of these exemplary schools remains unclear, because the schools were *selected* to have both characteristics, and the apparent relationship between the two may be only the result of careful selection. Still, the concern with the use of resources to enhance particular teaching conditions, plausibly related to learning outcomes, is a step in the right direction. Future studies could continue to examine exemplary schools known to have strong outcomes, controlling *both* for conventional resources and for the family backgrounds of students, and then search for evidence about how resources are used.[23]

We note that the inference problems evident in the Miles and Darling-Hammond study are common in the discussion of effectiveness and resource use. The most common approach, particularly in journalistic

accounts like Jonathan Kozol's *Savage Inequalities* (1991), is to identify obviously ineffective schools and show they have inadequate teaching conditions— uncaring teachers, inadequate textbooks, insufficient space, etc.—and then to argue for additional resources. But if the underlying problem is that resources are not translated into positive teaching conditions (e.g., from equation 2), then no amount of additional resources will fix the problem.

Estimating Structural Equations

A final possibility is that it might be possible to estimate equations like (2) and (3)—or the more detailed equations in (4), (5) and (6)—to replace the standard educational production function in equation (1). (This tactic continues to assumes that such stable relationships exist, contrary to the argument, from Murnane and Phillips (1980) and others, that individual teachers uncover a different relationship for each student.) The crucial issue in doing so is to open the black box of schooling—in particular, to estimate equations for learning processes, rather than assuming them away in reduced-form equations. Such results would potentially generate more information about which of many possible teaching conditions contribute to outcomes, as well as the process of converting resources into effective teaching conditions, and information like this might be the only evidence acceptable to hard-nosed quantitative types. In addition, once information is available on those teaching conditions that matter most to outcomes, then more refined accounting exercises of the kind common in school finance would be possible—for example, examining inequality in teaching conditions compared to the inequality of expenditures per pupil, and analyzing the patterns in teaching conditions among districts of different wealth, racial and income composition. For example, it's possible that students in urban districts are rich in expenditures per pupil or total resources, but poor in effective or active resources.

In one study that estimates equations like (2) and (3), Raudenbusch and his colleagues used NAEP data first to determine that four measures of resources—what we would call teaching conditions—were effective in enhancing NAEP math scores: the disciplinary climate of the school, the presence of advanced course offerings, the preparation of math teachers in mathematics rather than some other subject, and the emphasis on reasoning in math classes (Raudenbusch, Fotiu, and Cheong, in press). While they did not estimate equations like equation (3), linking these teaching conditions to resources like spending per pupil, they did examine the allocation of these teaching conditions and found differences in access to resources by parental income and race (Raudenbusch, Fotiu, and Cheong, 1998). Whether these inequalities are greater or less than the inequalities in spending per pupil is unclear, though it's plausible that some of these teaching conditions—particularly instructors teaching in their field—are much more inequitably distributed than money, especially in some urban districts.

Similarly, Goldhaber and Brewer (1997) used NELS data to estimate the effects of both

teacher characteristics (like experience, certification, and major) and teacher behavior like control over discipline and teaching technique, the use of small groups, questioning, and problem-solving. While some of these teacher practices led to higher math scores, they found very little relationship between teacher characteristics and teacher behavior—implying that buying expensive characteristics like more teacher education and experience did not necessarily lead to more effective practices. In addition, some of the teacher practices—the percent of time teaching in small groups, the percent of time instructing individuals, the emphasis on problem-solving—*reduced* test scores, implying either that these constructivist practices lead to improvements that are poorly measured in conventional test scores, or possibly that the proponents of conventional "skills and drills" are right. Thus the more detailed these production function become, the more it may be important to have an array of outcome measures. The results clarify the difficulty of converting resources R into effective teaching characteristics TC (as in equation 2 or 4).

However, in general researchers in the U.S. are a long way from being able estimate such equations. (Surprisingly, there appears to be a greater ability to carry out this kind of research in third world countries, where special studies paying attention to conditions within schools have been more common.[24]) In most U.S. data sets, information about teaching conditions are sparse to non-existent; indicators of student ability to benefit from instruction are even more likely to be missing. In addition, some teaching conditions are by construction extremely varied and therefore difficult to measure: in student-centered classes, for example, approaches to teaching vary from student to student, and therefore it may be necessary to measure teaching conditions at the level of individual students, not teachers or classrooms.[25] These kinds of equations linking teaching conditions to outcomes need to be cumulative, examining the experiences and resources students have had over the 12 years of their elementary-secondary education, and probably the consistency and continuity of these experiences as well—rather than looking cross-sectionally at the resources and teaching conditions available in one particular year. Outcome measures, which in theory encompass a wide range of conventional and "authentic" measures, and change scores as well as levels, in practice usually get reduced to conventional test scores (as in the NAEP results). And the logic of linear regression is wholly inadequate to educational processes in which several conditions may be jointly necessary before learning can take place. These are arguments for the development of new data sets, created with the information requirements of the "new" school finance in mind, and potentially using experimental designs rather than continuing to use data of the kind now available to estimate production functions of ambiguous interpretation.

Each of these four strategies for research has its own drawbacks. The first of them, the investigation of "natural experiments" where resources are suddenly increased, usually provides little information on the effectiveness

of the practices changed. The second, the examination of reform efforts, can make comparisons only within a group of schools trying to reform, and the link between reforms and outcomes often remains troublesome. The third, a slightly different way of carrying out research in the effective schools tradition, suffers from all the problems of that earlier body of work. And the fourth, the effort to estimate equations describing more carefully what happens within schools and classrooms, suffers from a variety of measurement and logical problems, some of which may be unresolvable.

However, given the inadequacies of the "old" school finance, and of researchers' understanding of the effects of different resources, there's not much point in continuing to follow conventional research strategies. Instead, a multi-pronged and overlapping effort, with due attention to the weaknesses of each particular approach, may be the best way to address the question of how best to use the educational resources for schools that have always seemed in such short supply.

IV. Implications for Educators and Administrators

Of course, schools don't wait for researchers to provide them with answers. District allocations and school-site decisions are being made all the time, for better and for worse. The question is therefore whether the perspectives of the "new" school finance provide any ways for administrators—including principals and others involved in site-based management—to think about the effective allocation of resources.

One conclusion from studies of administrators is that they spend relatively little time worrying about enhancing the "productivity" or effectiveness of the resources they have at their disposal. Boyd and Hartman (1988) point out various reasons why this might be true: uncertainty abut what factors will increase learning; organizational factors, including "loose coupling" and the lack of control over teachers' actions; and political constraints on the ability of principals to direct teachers, including the opposition of unions. One way of summarizing these findings is that, in the absence of real freedom to reallocate resources and of clarity about how they should be reallocated, harried principals and other school-site administrators simply don't have the time to worry about it. This in turn implies that district decisions about resources dominate, wit "decisions" established by precedent and only small and marginal changes possible.

Where principals have had more say over budgets, they have become increasingly skilled at responding to the incentives they face. In England, for example, the introduction of grant-maintained (GM) schools freed school heads from local district authority, and enabled them to allocate resources subject only to a board of governors—though with the requirement to teach the national curriculum and to be measured by tests linked to the national curriculum. Under these conditions most heads of GM schools have managed to practice some selectivity, excluding special education students

and other pupils (including lower income and minority pupils) who cost them more, either in resources to enhance their performance or in lower test scores. Schools have spent more money on aspects of "show"—spruced-up buildings and grounds, for example—since this is important in competing for students. And many heads have discovered the formally correct strategy given the publicity surrounding their passage rates on certain tests: the triage strategy is to concentrate the best teachers—whom heads know better than any outsider or researcher ever could—on the students just at the margin of passing, in order to get them over the threshold; heads allocate adequate teachers to those students who are likely to pass on their own; and students with little chance of passing are kept "warm and dry," with the least effective resources allocated to them (Finkelstein and Grubb, 1998). The same triage strategy has apparently emerged in Texas, where the state's accountability system requires that 45 percent of students in all groups (white, black, Latino, and economically disadvantaged) pass the TAAS (Texas Assessment of Academic Skills) test. Schools have then concentrated their resources on the students who perform close to the pass rate; those who will pass without additional effort by the school, and those who have no chance of passing under any reasonable conditions, are comparatively ignored.[26] The point is not that these resource priorities are the best ones, certainly not for the lowest-achieving students; the point is that school administrators can quickly learn how to allocate resources rationally when the opportunity and necessity present themselves. Note that rational allocation requires knowing who the most effective teachers are—something that is achieved in England, and a few American schools, by administrators observing in classes constantly.

One advantage of site-based management, then, is that with the right incentives it would force school administrators to think more carefully about the effective allocation of resources—that is, about the allocation of funds under their control (R) to teaching conditions that are effective (TC). But agreeing about what the incentives should be, then operationalizing them, and finally providing the necessary freedom to allocate resources are all politically quite difficult, particularly in bureaucratic urban schools. One alternative (or complement) would be for administrator preparation programs to provide principals, other school-site administrators, and district administrators with the information and the perspectives to enable them to think more carefully about the allocation of resources, for example through realistic projects and simulations. This would be a marked advance over current programs in which the allocation of resources seems to be relegated to last in a long list of priorities.[27]

The tactic of relying on the judgment of administrators to allocate resources effectively is a specific version of the approach, mentioned in Section I, of giving decision-making power to the individuals thought to be best able to make effective decisions. However, the ability of administrators to make these decisions matters little if they are not given any discretion. We note that there have been contrary impulses about the responsibility of principals and other

school-level administrators, just as there have been for teachers: one impulse has been to grant them greater authority (represented in site-based management); the other has been to constrain their actions tightly, to "idiot-proof" schools by constraining the curriculum, assessments, and the allocation of resources tightly—and by subjecting schools to dire consequences if they fail (as in "naming and shaming"). Thus the question of the role that administrators can and do play in allocating resources is ultimately dependent both on the capacity of administrators to make these decisions, and on the state and district policies that allow them the freedom to do so.

V. Implications for Public Policy and School Reform: Creating Complementary Reforms

Finally, what are the implications of the "new" school finance for the policies enacted by districts and states? If the "new" school finance is a particular perspective at this stage, rather than a set of concrete recommendations, how can it be useful?

One implication is that a simple question, or thought experiment, would be valuable before many policies are enacted: What will happen within schools and classrooms if a particular change involving additional resources is made? The popular idea of class size reduction provides a good illustration. While some teachers may be able to use smaller classes to teach in different ways, others may not have much idea about how to modify their teaching in smaller classes—so some staff development might be an appropriate complement. The shortages of qualified teachers that have materialized, especially in urban districts, could have been foreseen, and so a teacher recruitment component could have been added. And the need for additional space that has constrained so many California districts was relatively clear from the outset. Therefore the pallid results from initial implementation, and the need to recruit and prepare teachers as well as to support school construction (CSR Research Consortium, 1999), could have been anticipated and forestalled by reallocating resources within this reform.

A similar thought experiment could be applied to the current efforts that we (and the British) call "naming and shaming." Some urban districts and many states have begun to rank schools based on conventional test scores, and publicized the low performance of the "worst" schools—a process of shaming. These are not necessarily the worst schools in any sophisticated sense: they typically have the largest proportion of immigrant and low-SES students, not surprisingly given the power of family background, and "naming and shaming" has often added to the humiliation of those groups. Such policies have then provided some "solutions" for low-performing schools ranging from reconstitution—the threat to replace all staff—to requirements in many districts for low-performing schools to come up with their own self-improvement plans to additional funds—though these improvements usually seem vastly inadequate to the task of

reforming schools. How precisely will these policies change the practices within classrooms? Will the demoralization among teachers outweigh the impetus to teach more diligently? Will the need to show improvement on test scores lead to more narrow teaching to the test, at the expense of the higher-order abilities that so many educators and business representatives have championed? Can schools without any slack resources, or that are thought to be low-performing, create their own improvement plans? Will the shaming process motivate students to work harder, or will it demoralize them too? Unless these kinds of questions can be answered unambiguously, it's hard to see how "naming and shaming" can lead to the improvement of teaching conditions within schools and classrooms—and these questions have rarely been posed, much less answered. The issue is not what answers that researchers or advocacy groups would give to these questions; the question is what answers policy-makers themselves would provide, and whether the need to answer such questions would cause them to think about proposed policies more carefully. Paralleling environmental impact statements, one could envision Classroom Impact Statements required to justify major policy enactments, in order to focus attention to these issues.

A corollary is that the "new" school finance asks policy-makers to think about the *complementary* policies required to change outcomes, rather than unitary changes. These almost always would take the form of resources plus some additional requisite—money for computers *plus* resources for professional development, class size reduction *plus* teacher recruitment, the creation of smaller schools (or schools within schools) *plus* resources for construction costs and a vision of how teachers and students will interact differently. The current standards movement provides incentives for improvement—as does "naming and shaming"—but often without providing the intellectual or financial resources to respond to these incentives. In many cases, resources plus technical assistance maybe necessary, in order to enable schools to implement reforms successfully. And in many successful reforms in Section III, a central vision—or vision plus resources—was necessary.

To be sure, sometimes policy-makers do think in these ways. A number of court cases involving school finance have led to broader legislative reforms[28]—implicitly (and sometimes explicitly) assuming that reshaping the allocation of money without reforming other school practices would be insufficient. Examples include the 1984 reforms in Texas, the 1990 reforms in Kentucky (Odden and Picus, 1992; Adams, 1994), and the 1991 reforms in New Jersey, in which legislators were explicitly unwilling to provide any more resources to urban districts without several accountability measures (Firestone, Goertz, Nagle, and Smelkinson, 1994). But legislators do not routinely create legislation incorporating several complementary reforms; often when they increase resources for a particular purpose there seems to be an imbalance between the central policy and its complements—too little professional development (or professional development of the wrong kind), too little technical assistance facing too many

implementation problems, too little vision, or a vision that can be variously interpreted and therefore can become diffuse and impotent. Therefore the perspective of the "new" school finance would try to establish a more careful balance among the complementary elements of a reform involving resources.

In terms of the instruments of policy, however, we come to a central problem. The existing state funding mechanisms for schools (and public colleges and universities too) allocate most of their money through general grants in aid, without restrictions on local spending; local revenue is raised through property tax mechanisms, and the amount but not the form of revenue is the main issues. But the "new" school finance, more concerned with spending resources in ways that affect schools and classrooms, would constrain funding—for example, by providing categorical rather than general aid, or by providing funding through constrained pilot programs designed to replicate successful practices, or by providing some unconstrained funding along with some constrained funding (e.g., for technical assistance or staff development) to make sure that resources change classroom practices. However, the approach of categorical funding is contrary to the devolution of control to the school level, and contrary to the tactic of allocating principals more discretion over funding so that they can better learn to allocate resources to the most effective practices.

And so we see at least two contrary proposals for "new" funding mechanisms that are more concerned with outcomes. One is exemplified by the work of Clune (1994), Duncombe and Yinger (1999), and the reforms in New Jersey: the first step would be to determine how much more funding is necessary for high-need schools and students, and the second step is to allocate these funds with incentives (like elements of performance-based funding) to spend these resources effectively. This is a centralized or top-down approach, with the central authority (district or state) determining needs and creating incentives. Implicitly, these plans start from the position, from the school effectiveness literature and other arguments, that adequate levels of resources are necessary but not sufficient for effectiveness. The first task is to define what "adequate" resources are, the subject of some effort over the past few years (e.g., Minorini and Sugarman, 1999; Guthrie and Rothstein, 1999). The second task is to try to promote the sufficient conditions for effective schools, usually by imposing some outcome requirements measured by conventional test scores (with all their well-known problems), or by requiring reviews and plans like those in New Jersey. The possibilities for incorporating incentives to improve teaching conditions, such as those mentioned in Section III, have not been explored so far, and so these funding proposals fail to link funding in any way to changes within schools and classrooms.

A second, more bottom-up approach is the proposal of Miles (1995) and Miles and Darling-Hammond (1998), in which individual schools develop their own reform strategies and then find the resources necessary for them (see also Odden and Busch, 1998). In many cases, schools may be able to reallocate existing

spending, converting "inert" to "active" resources—for example by replacing non-teaching personnel by classroom teachers to reduce class size and allow all teachers to know their students well. Only after that would schools search for new funding, either from outside sources (like foundations) or from new public resources. In effect, this approach allows the school rather than the state legislature to define what "adequate" resources are, and then relies on the vision behind the reform to assure that the resources are effectively spent. This kind of reform-driven funding—where schools with particular visions and specific funding needs apply for special-purpose funds—also underlies the various local education funds around the country, like the Boston Plan for Excellence that provides mini-grants for schools in the midst of reform projects (White, 1999). These funds tend to provide resources for relatively specific reform purposes upon application, so that funders can judge the clarity of vision and strength of the reform proposal before allocating any resources.

The top-down funding mechanism is driven more by the need to provide funding and the incentives for effective spending to all schools. The bottom-up approach may be more effective for those schools with clear visions, but it doesn't provide any direction for schools that are too disorganized, or harried, or internally contentious, to develop such visions. One question is then whether some hybrid approach is possible, avoiding the inequities of the bottom-up or reform-driven funding mechanism while still providing discretionary resources for schools with clear visions, and providing some incentives for reform for the most disorganized schools. One possibility, for example, might be to structure a three-part funding mechanism:

1. A formula would allocate resources to individual school accounts, where—following the current logic of adequacy in school finance—more resources would be allocated to schools and districts with higher student needs.
2. Schools could spend some relatively high fraction of these resources by right, though they would be subject to performance standards and incentives, as in top-down approaches.
3. The remaining fraction of funds in their account (perhaps 10 percent?) could be accessed only with a multi-year improvement plan emphasizing spending that would enhance classroom and school conditions.

Schools with inadequate performance might have higher amounts in this "discretionary" account, or they might be provided additional technical assistance; this could potentially get around the problem of the neediest schools being unable to apply successfully for the amounts in their discretionary account. Then equity would be defined by the total resources in a school's account, though actual spending levels might differ from these amounts. If a school failed to qualify for all the funds in its account, it would be partly to blame for not receiving all the resources it could, and it would have an

incentive to put together a coherent school improvement plan.

Such a strategy places much greater burdens on district or state officials to monitor performance and evaluate improvement plans than is now the case, and the feasibility of such careful monitoring for all 88,000 schools in the country seems remote, at least for now. But this is the spirit of the "new" school finance—that in the end resources will be much more effectively spent if some fraction of existing funds are reallocated to allow more careful consideration, by individuals within a school as well as "outsiders,"[29] of how resources should be used.

Many specific mechanisms of state and district policy mentioned in this section—the consideration of how policy changes are likely to affect school and classroom conditions (or Classroom Impact Statements), the creation of incentives for schools to spend resources well, the specific procedures for school improvement plans—require much more judgement about the quality of schooling than is evident in current debates about finance, which tend to emphasize the technical details of funding formulas. But that too is the spirit of the "new" school finance—that policy-makers should start to worry not only about the allocation of resources, but also about how those resources are spent. This in turn requires a certain kind of politics to emerge, one concerned with the quality of education rather than the division of the spoils.

VI. Toward a New Narrative for Spending

Throughout this century, a couple of simple narratives have dominated the efforts to fund schools. The dominant one is simply that more is better, and that the solution to any problem—whether evidence of ineffectiveness, or efforts to include students denied full access to schools—is to increase spending. A second has been the concern with equity in spending, particularly equity among districts within states, creating a long history of efforts to revise funding formulas and to harness the power of courts, particularly in lawsuits following the *Serrano* case. But the flaws in these narratives have now become apparent, as spending has increased without eliminating the dissatisfaction with public education and as efforts to enhance equity in spending have failed to narrow the disparities in outcomes. Evidently, some different approach is necessary.

The "new" school finance is at least a candidate for replacing these older narratives. Without abandoning the current preoccupations with spending levels and equity, it would add an emphasis on effectiveness that is quite consistent with the current interest in accountability. It responds to the concern within the history of American education for efficiency (e.g., Callahan, 1967), one that explicitly links resources with results. And by focusing on experiences within schools and within classrooms as well as resources, it is consistent with the currents of reform over the past 15 years that have emphasized the inner workings of classrooms and schools, the pedagogies and

cultures appropriate to enhanced learning. There's much to build on.

But ideas don't come to dominate policy unless they attract widespread allegiance, with support from research (or evidence in general), teachers and administrators themselves, policy-makers, and parents. This is why we have stressed the implication of the "new" school finance for several different groups of participants, in Sections III, IV, and V: only when there is some consistency in perspective and practices can a new vision emerge.

Of course, there are also barriers to any novel narrative. At the moment, the nature of politics is a serious barrier since the preoccupation with dividing the spoils—a politics geared to the "old" school finance—is hostile to the concern with effective practice; part of changing a policy narrative is changing the politics that supports it. In addition, policy narratives are often distinguished by their simplicity, and it's possible that a complex narrative—like the "new" school finance, with its emphasis on the *multiple* necessary conditions for effectiveness—will prove too complex and too varied to be widely accepted. Finally, old habits die hard, and it will be difficult to introduce these perspectives to the vast numbers of administrators, teachers, policy-makers, parents, and researchers in ways that make them stick, to prevent backsliding into old ways of thinking. But the alternatives are grim: without the kind of political change necessary for the "new" school finance to emerge, spending for education will keep escalating (as in Table 1) without much improvement to show for it.

TABLE 1 Expenditure per pupil (ADA) in public elementary-secondary schools

Constant 1997-98 dollars

School year	Current expenditure
1919-20	$453
1929-30	$819
1939-40	$1,020
1949-50	$1,437
1959-60	$2,065
1969-70	$3,494
1974-75	$4,261
1979-80	$4,733
1984-85	$5,307
1989-90	$6,343
1994-95	$6,440
1997-98	$6,624

Source: *Digest of Education Statistics (1998)*, Table 169.

TABLE 2 Educational Expenditure as a Percentage of Gross Domestic Product, 1995

	Expenditures for all levels	Expenditures for primary and secondary education
United States	6.7%	3.9%
Australia	5.6%	3.7%
Austria	5.5%	3.9%
Canada	7.0%	4.3%
Czech Republic	5.7%	3.9%
Denmark	7.1%	4.3%
Finland	6.6%	4.2%
France	6.3%	4.4%
Germany	5.8%	3.8%
Greece	3.7%	2.8%
Hungary	5.5%	3.6%
Iceland	5.2%	3.6%
Ireland	5.3%	3.4%
Italy	4.7%	3.2%
Japan	4.7%	3.1%
Korea	6.2%	3.8%
Mexico	5.6%	4.0%
Netherlands	4.9%	3.2%
Portugal	5.4%	4.1%
Spain	5.7%	4.0%
Sweden	6.7%	4.5%
Turkey	2.4%	1.6%

Source: OECD (1998), Tables B1.1a, B1.1b.

Endnotes

[1] NCES (1999), Table 94. These figures are for 1994-95, when average spending per pupil in the country was $5,989.

[2] See, for example, the discussion of joint causality in Marini and Singer (1988), particularly Mackie's (1974) "inus" condition where a variable is an "insufficient but non-redundant part of an unnecessary but sufficient condition

[3] In this review we will consistently refer to both school-level and classroom-level effects. We often assume that the two are complementary—for example, that it's easier for individual teachers to maintain order, or high standards when those are priorities for the school—but we will not develop this relationship. For the critique that research on teacher effects within classrooms and research on school effects are largely independent, see Teddie and Stringfield (1993), Chapter 10.

[4] See especially the articles in Berne and Picus (1994), a volume that explicitly searches for the conditions necessary for outcome equity rather than input equity; several of the articles in Monk and Underwood (1988), especially the contributions by Gamoran (1988) and by Brown and Saks (1988); the articles in Odden (1992); Odden and Busch (1998); David Monk (1994a); King and MacPahil-Wilcox (1994); Barro (1989). Even the interchange between Hedges, Laine, and Greenwald (1994) and Hanushek (1994), which turns largely on technical issues of how to carry out a meta-analysis, finally concludes that money might matter under some conditions— though these conditions are yet unknown. More recently Cohen, Raudenbusch, and Ball (1999) have distinguished between "inert" and "active" resources, a distinction that again clarifies that resources are likely to be ineffective ("inert") unless spent on certain practices or accompanied by other conditions to make them "active." A long-ago foray into school finance by one of us tried to distinguish equality of revenues from equality of inputs, real resources, and outputs (Grubb and Michelson, 1994, p. 6), where real resources are precisely equivalent to the teaching conditions described in section II below.

[5] Public issues tend to be governed by policy narratives, or easily-understood and widely-accepted stories, that are themselves the results of long development. In school finance, the dominant narrative is still one about the efficacy of expenditures, which in turn drives the political pressures for more resources. The contrary perspective, that "resources don't make a difference," the result of the production function literature reviewed in Section II, has not become a policy narrative because it is not supported by any parents, educators, or policy-makers. On policy narratives, see Roe (1994).

[6] See also Fuller and Clark (1994), contrasting the "policy mechanics" in the production function tradition with the "classroom culturalists" emphasizing the socialization of children in classrooms to various norms. They too call for bridging this particular divide.

[7] We use the British term "naming and shaming" to describe the state or district policies that administer a standardized test, identify the worst-performing schools, shame them in the local papers, and then require them to make some changes. The process of "naming" or identifying these low-performing schools is fraught with methodological problems, and the remedies (ranging from state takeover to reconstitution to pitifully small grants to self-improvement plans) are invariably inadequate to the task. The only effective feature of these policies seems to be the shaming process. These policies, which have burgeoned as part of the standards movement, merit substantially more analysis.

[8] The A.I.R. report is a good example of simplification in action. Reforms are rated on a 5-point scale similar to that used by *Consumer Reports*; the text provides a few additional comments on the quality of evidence, but fails to provide any citations for those who might want to check the data for themselves. It's hard to learn much from this volume except that the evidence in favor of "promising practices" isn't substantial.

[9] Random-assignment studies are much more common in job training but not necessarily more informative, because they often fail to ask what characteristics of programs are responsible for their success or failure. For this critique see Grubb (1996) or Grubb and Ryan (1999).

[10] Some consensus seems to be emerging on hybrid methods drawing from both traditions (see the National Research Council's review of the reading wars by Snow, Burns, and Griffin, 1998), but hybrid approaches are immensely varied and probably unstable.

[11] There's a somewhat different literature examining the effects of school spending by state on subsequent earnings, but this too yields ambiguous results; see Card and Krueger (1996).

[12] Presumably this is true, though there was a reassignment after kindergarten that was certainly not random. Krueger (1997) has corrected for this problem and confirmed the effects of smaller class sizes, though the effects are substantial (4 percentile points) only for the first year a student is assigned to a small class, and drop to one percentile point for subsequent years.

[13] It might be possible to develop more easily-measured proxies instead of direct observations of classroom and school practices. For example, Mayer (1999) has found that self-reported measures of behaviorist versus

constructivist teaching practices are highly correlated with observation-based measures. But such proxies could be used only after they had been validated through observation, and so the process of collecting information on the way resources are used would be much more difficult.

[14] The reformulation in equations (3) and (6) continue to assume that there are measurable characteristics that affect outcomes in stable ways. Murnane and Phillips (1981), finding that teacher characteristics did not affect learning, argued that effective teachers do not have any common characteristics, except that they are able to discover early in the school year the subtle interventions, varying among students, that make for effective teaching. Whether this means that relationships like equation (3) are impossible, or whether it implies that a particularly difficult measure of TC is necessary, is unclear.

[15] I have taken the idea of such an equilibrium from Harkin and Davis (1996a, b). The idea is useful is explaining why some classes seem to "collapse"; see Grubb and Associates (1999), especially Chapter 2 and 6.

[16] If two kinds of resources are jointly necessary, then schools will be effective only when both are present—but the linear additive functional forms of most statistical work will find each of them *independently* contributing to outcomes. Interaction terms are not necessarily satisfactory because they often generate collinearity and imprecise parameter estimates.

[17] The positive effect of teacher verbal scores or ability measured in some other way is one of the only relatively strong findings in the conventional production function literature.

[18] Often people talk about class size reduction as valuable for allowing a greater amount of "one-on one" or individualized instruction. However, if classes are reduced from 25 to 20, and teachers spend about half their time on whole-class instruction and the remaining half on "one on one," then a reform that costs an additional 20 percent in resources for classroom teachers increases the amount of individualized instruction for every student from 18 hours per year (180 days x 5 hours per day x 1/2) to 22.5 hours. In small amounts throughout the school day this might be quite effective, but only if teachers are using individualized instruction in effective and equitable ways.

[19] In the field of writing, a meta-analysis has concluded that the presentational (or didactic) mode and the conventional teaching of grammar are the least effective (Hillocks, 1986); similarly, the National Assessment of Educational Progress concluded that writing proficiency is positively related to teachers' use of the writing process (Applebee et al., 1994) rather than grammar-based instruction. Knapp and his colleagues (Knapp et al., 1993; Knapp et al., 1995) examined math and English scores in elementary classrooms with high proportions of low-income students, and found that classrooms with larger numbers of "alternative" practices—which they defined almost precisely as we describe meaning-making—led to significantly higher scores. Some specific practices in the meaning- and student-centered tradition have been found to be more effective, including co-operative learning (Slavin, 1980; Walberg, 1986) and reciprocal teaching (Palincsar and Brown, 1984; Brown and Palincsar, 1989; Brown and Campione, 1994).

[20] Teachers in reduced-size classrooms reported less time spent on discipline, and more time addressing student's individual concerns; some other differences (like discussing student-initiated topics and diagnosing individual learning needs) were positive but not significant. The direction of changes were all consistent with shifts toward more student-centered and constructivist practices, though they were too small to be of any real effect. But these averages conceal substantial variation, and so the real question is which teachers, under what conditions, changed their teaching practices.

[21] In a world of fungible resources, it's often difficult to detect what a particular source of revenue is spent on.

[22] In all these evaluations the comparability of the comparison group is an issue, since none of these evaluations use random assignment methods.

[23] Technically, schools with large positive residuals from equation (1) would be selected. The error term in this equation is a function of the error terms in equations (2) and (3) and (depending on the functional form of these equations) some of the parameters in these equations as well. In general, then, these will be schools that have either high levels of positive teaching conditions given resources (high e), high levels of outcomes given teaching conditions and the family backgrounds of their students (high u), or particularly large parameters connecting resources to outcomes, from equation (3). Case studies of exemplary schools defined in this way would then search for evidence about which of these characteristics seem important. Having admitted that linear regression is a poor technique to capture the causal mechanisms in schools—particularly the joint effects of necessary but individually insufficient conditions—it would not make sense to consider these statistical methods as anything but a rough guide for further study.

[24] Fuller and Clark (1994) summarize the effects of a number of variables describing classroom organization, pedagogy, school management—all aspects of teaching conditions. See also Fuller et al. (1999), who were able to examine the influence of a large number of teacher practices on literacy in Brazil through the use of classroom observations.

[25] See especially the discussion by Cohen, Raudenbusch, and Ball (1999) of teaching "regimes," which are ways of adjusting teaching to the interests, capacities, strengths and weaknesses of individual students. Capable student-centered teachers therefore change their practices for individual students, whereas conventional didactic instructors have only one prescribed regime—so the teaching conditions in their classes are stable across students and easier to measure. This idea is similar to the point of Brown and Saks (1984, 1987), that teachers may allocate resources differently among students within their classrooms.

[26] Oral communication, Richard Lavine, Center for Public Policy Priorities, Austin, TX. Apparently these rational strategies are widely acknowledged though they have not been formally researched.

[27] See, for example, the treatment of resources in conventional texts for school administrators. To take a random sample, Hughes (1999) has only two pages on funding; Speck (1999), while paying considerable attention to the educational rather than managerial roles of principals, has nothing at all about resource allocation; Seyfarth (1999) and Drake and Roe (1999) each allow a single chapter near the end of their texts, and both treat resources as budgeting issues rather than as educational decisions. For one effort to clarify the funding issues for administrators, see Monk and Plecki (1999). It may be that the neglect of resource allocation simply reflects the reality that most principals have little discretion, or don't know enough about effective allocation—but the inattention to resources simply perpetuates the problem.

[28] Litigation is a particularly crude instrument for reshaping policy, since it can only say that certain practices are unconstitutional. When courts have declared current inequitable patterns of spending to be unconstitutional, legislatures have responded with more equitable distributions of resources. But courts cannot order greater equity in effective spending or active resources because that would take them too far into the prerogatives of educators. The only solution has therefore been to throw the decisions back to state legislatures. In the few cases mentioned in the text, legislatures have responded with more elaborate reforms in addition to equalizing funding.

[29] As a side note, we advocate classroom observations by insiders and outsiders as the basis for school improvement plans. Under the best conditions in England, inspections of schools and colleges by a combination of insiders and outsiders is used to identify the "corporate" or institutional methods of enhancing the quality of teaching, and then schools develop multi-year improvement plans to implement these reforms (Grubb, 1999 or forthcoming). Of course, inspection can be used for punitive as well as supportive purposes, so it must be carefully designed. For some efforts to incorporate inspection (or school visits) into accrediting visits, see Wilson (1999).

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